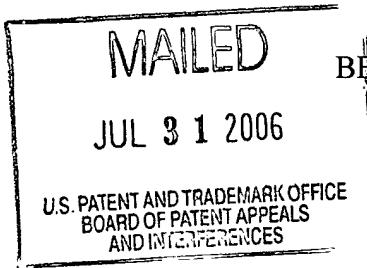


The opinion in support of the decision being entered today was **not** written for publication in a law journal and is **not** binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE



BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANCIS KO,
RICHARD CHEN,
and CHARLIE LEE

Appeal No. 2006-0877
Application No. 09/894,230

ON BRIEF

Before PAK, KRATZ, and JEFFREY T. SMITH, *Administrative Patent Judges*.

JEFFREY T. SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 16 to 24 and 37 to 39, all of the pending claims. We have jurisdiction under 35 U.S.C. § 134.¹

¹ In rendering this decision we have considered Appellants' arguments presented in the Brief filed June 23, 2005 and the examiner's position presented in the Answer mailed October 17, 2005.

CITATION OF REFERENCES

In rejecting the claimed subject matter on appeal the Examiner relies on the following references:

| | | |
|------------------------------|--------------|---------------|
| George et al. (George) | 4,980,563 | Dec. 25, 1990 |
| Kishimura | 5,123,998 | Jun. 23, 1992 |
| Tsai et al. (Tsai) | 5,899,748 | May 4, 1999 |
| Young et al. (Young) | 6,255,022 B1 | Jul. 03, 2001 |
| Sato | 6,337,163 B1 | Jan. 08, 2002 |
| Schroeder et al. (Schroeder) | 6,379,869 B1 | Apr. 30, 2002 |
| Rangarajan et al. | 6,451,512 B1 | Sep. 17, 2002 |
| Singh et al. (Singh) | 6,479,820 B1 | Nov. 12, 2002 |

The Examiner entered the following rejections:

- (a) claims 16 and 17 stand rejected under 35 U.S.C. § 103(a) over the combined teachings of Sato, Young, and Schroeder;
- (b) claim 18 stands rejected under 35 U.S.C. § 103(a) over the combined teachings of Sato, Young, Schroeder, and Tsai;
- (c) claims 19 to 23 and 37 to 39 stand rejected under 35 U.S.C. § 103(a) over Sato, Young, Schroeder, Tsai, Kishimura, Singh, and George; and
- (d) claim 24 stands rejected under 35 U.S.C. § 103(a) over Sato, Young, Schroeder, and Rangarajan (Answer, pages 3 to 24).

The invention on appeal relates to a method for increasing the selectivity of a photoresist. According to Appellants (Brief, page 1), the claimed invention provides for improved selectivity of silicon-containing photoresist which allows for amelioration of a subsequent etch profile.

Representative claim 16, as presented in the Brief, appears below:

16. A method for increasing a selectivity of a photoresist, comprising:

providing a substrate with a developed silicon-containing photoresist layer disposed over a non-silicon containing photoresist layer, the developed silicon-containing photoresist layer including polymer chains containing silicon;

exposing the substrate and the developed photoresist layer to an ultraviolet (UV) light, the UV light emanating from a UV generating agent;

converting a top portion of the developed silicon-containing photoresist layer to a hardened layer, the hardened layer being created by cross-linking the polymer chains containing silicon, the cross-linking being activated by the UV light; and

performing an etch using the hardened layer.

OPINION

Upon careful consideration of the entire record, we find that we are in agreement with Appellants that the Examiner's rejections are not well founded. We will limit our consideration to independent claims 16 and 37.

The Examiner determines that Sato discloses a method for improving etching resistance, i.e., increasing selectivity of an organosilicon photoresist (Answer, pages 3 to 5). The Examiner in discussing EXAMPLE 1 of Sato identifies the features that are similar to the present invention. More specifically, Sato discloses the development of an organosilicon underlying film (12) that contains hardened regions (16). Referring to Figure 1C, the Examiner explains the resist pattern (14) and the electron beam hardened regions (16) function as etching masks for dry etching of the unexposed/unhardened regions to form an underlying film pattern

portion (17) (shown in Figure 1D). Figure 1D clearly exhibits that the hardened area (16) functions as an etching mask. However, the process of Sato differs from the claimed invention in that the developed silicon-containing photoresist layer is not disposed over a non-silicon-containing photoresist layer. The Examiner relies on the Young and Schroeder references for teaching that persons of ordinary skill in the art would have known that a resist could have been formed having an organosilicon-containing photoresist layer disposed over a non-silicon-containing photoresist layer. The Examiner further explains that Young and Schroeder disclose the hardening/development of the top silicon-containing photoresist layer followed by a subsequent etching (Answer, pages 6 to 8). The Examiner concludes that a person of ordinary skill in the art would have found it obvious to form the process of Sato wherein the photoresist comprised a developed silicon-containing photoresist layer over a non-silicon-containing photoresist layer in the process of Sato.

Appellants argue that the Young reference is incompatible with the teachings of Sato and would render Sato unsatisfactory for its intended purpose (Brief, pages 6 and 7). We agree.

While it may be known, as suggested by the Examiner, that a photoresist could be formed comprising a silicon-containing organosiloxane over a non-silicon-containing organosiloxane, this does not indicate that such structure would be suitable for the invention of Sato.² Specifically, Sato requires the underlying film to be a material whose etch rate is

² We note that Appellants have not argued that it was not known to develop a silicon-containing photoresist layer, or that the formation of a photoresist comprising a silicon-containing photoresist layer over a non-silicon-containing photoresist layer would not have been obvious (see Brief

Appeal No. 2006-0877
Application No. 09/894,230

lowered by the irradiation of a charge beam (see column 5, lines 53-62). As such, if the Examiner's exchange of the order of layers of Sato were achieved the resulting structure would not meet the requirements as specified by Sato. Accordingly, we agree with Appellants' argument (Brief, page 7) that the suggested modification would render Sato unsatisfactory for its intended purpose.

In view of the foregoing, the Examiner has failed to establish a prima facie case of obviousness to support the stated rejections. The Federal Circuit has held that "[i]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Consequently, the rejections of the Examiner are reversed.

generally). Appellants have also not argued that the developed/hardened portion of a silicon-containing photoresist layer does not function as an etch mask as suggested by the Examiner.

Appeal No. 2006-0877
Application No. 09/894,230

REVERSED

Chung K. Pak
CHUNG K. PAK
Administrative Patent Judge

PETER F. KRATZ
Administrative Patent Judge


JEFFREY T. SMITH
Administrative Patent Judge

JTS:clm

Appeal No. 2006-0877
Application No. 09/894,230

Martine, Penilla & Gencarella, LLP
710 Lakeway Drive
Suite 200
Sunnyvale, CA 94085